

The American Fertilizer

Vol. 95

DECEMBER 6, 1941

No. 12



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NITRATE of SODA

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SULPHATE of AMMONIA

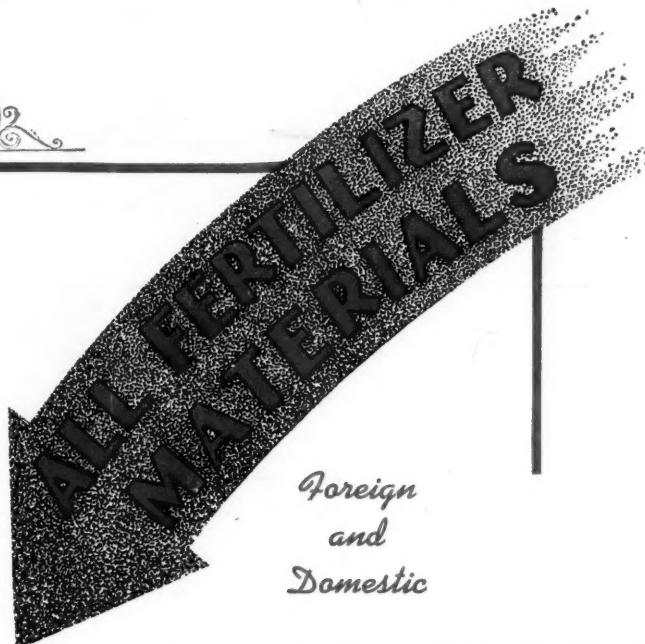
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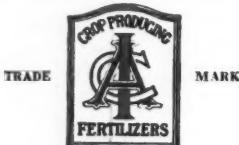
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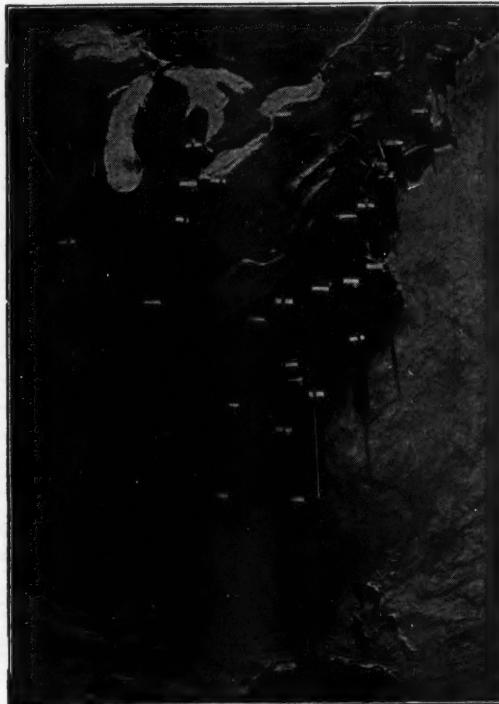


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AMERICAN FERTILIZER

"That man is a benefactor to his race who makes two blades of grass to grow where but one grew before."

Vol. 95

DECEMBER 6, 1941

No. 12

Food in Peace and War

By ROY F. HENDRICKSON

*Administrator, Surplus Marketing Administration and Director of Marketing,
U. S. Department of Agriculture*

An address at the convention of the National Fertilizer Association,
Atlanta, Georgia, November 19, 1941

IN the present war emergency over-confidence should be given a holiday. Far too few people appear to be fully aware of the extreme difficulty of reaching the objective apparently agreed on—to break Hitler's tyranny.

We came out of the First World War flushed with confidence—and we are still satiated with it, despite the fact that the situation now has more dissimilarities than similarities to the World War situation. Then there was a definite Western front where our Allies were unbowed when we entered the conflict. Then the great German genius for military organization had not blossomed as now it has. Hitler's military successes are without parallel; the Kaiser's victories are insignificant by comparison. Territory already gained by Hitler, the difficulty of flanking him, the vulnerability of our Nation's friends—all these and more show that the situation is far more serious than in 1917-18.

It is true that in this country our productivity, farm and industrial, had to be increased greatly to meet First World War needs. But the rise from the pre-war to the full emergency level was not as great then as that which we face now. Change in the type of warfare is one factor accounting for this—the vastness of the potential war theatre is another.

Inheritance of confidence from the First War is understandable and not without a basis, but it is keeping us from opening our eyes wide and focusing them steadfastly on the size and danger of the job we are undertaking. We need confidence, but just now we need far more to push production into high gear all along the front of war essentials.

Consider the food production responsibilities that the war emergency has created, and is adding to daily. Secretary of Agriculture Wickard, acting with true foresight, has established far-reaching production goals—not extravagant, not excessive in any way. Many persons have come to assume that, hesto-presto, these goals will be attained. Instead, a very real possibility exists that we will fall short of many of them—even though farm production and marketings next crop year will be the largest in our history.

The reasons for this increased production—of nearly everything outside of cotton, wheat and tobacco—are growing. British needs are increasing; Russian needs are coming significantly into the picture. Domestic requirements are expanding. On top of all this, the place of reserves, of stock piles ready for areas now conquered, when they can cast off Hitler's stranglehold, are being seen more clearly—a staggering total. Farmers, their leaders and public servants, and the industries associated with farm production and marketing, will not meet their responsibilities with simple ease. Cooperation of the highest type is going to be necessary.

I think we must begin by visualizing our situation at home. Food production costs are rising, and they haven't all been counted yet. American farms supply more young men for our armed forces than any other source. Others are going to defense industry. As a result, the supply of available labor, at a time when the need for labor is greater than ever, is having a significant effect not only on production costs but on the even more significant

point—the very ability to produce. This isn't 1933 or 1938. There now are limits to our farm productivity that are very real. The idea of an American equivalent of the English land army of girls and women may not seem foolish eight months hence in many areas.

Fertilizer's Responsibility

The materials for farm production, especially machinery and fertilizers, also present serious problems. I know that you have been discussing the fertilizer problems in some detail here, and no doubt you are looking carefully ahead to 1943 and 1944. Our planning now cannot afford to leave those years out of consideration. In supplying fertilizer—and at reasonable prices—you have a singularly important responsibility throughout the country and especially in the South where the extent of dependence of agricultural production on your products is greatest. In your responsibilities to maintain reasonable prices, you are dealing with a major factor in production costs, which are rising as a result of factors largely beyond the control of farmers.

Too frequently the increases now under way in production costs to farmers are overlooked. Gross farm income is advancing, but real income, measured in terms of the farmer's buying power, is not rising nearly as fast. The long struggle for equality in the purchasing power of farmers, as compared with other groups, has not come to a close. That fight has always been concerned basically with net income and its purchasing power—the share that farmers can spend for clothing, for food they do not—often cannot—produce for themselves, for housing, for education, for subscriptions to newspapers, for churches and for amusement.

Three Types of Consumers

The farmer, thinking of the home front, recognizes three major income classes of consumers. First are the well-to-do who consume about the same year in and out, and for whom some rise in food prices reflecting increased production costs may not be very significant. Second are those who continue to be self-supporting, but whose incomes are at levels where higher prices for food work a real hardship. This is the largest group—the group most often called upon to make sacrifices during war or depression.

The third group are those who are relatively helpless to adjust to changing situations—the public assistance income group. There still are more than ten million persons in this category today—and the most optimistic statis-

ticians I have talked with believe that maximum industrial production will not reduce this group below seven to eight million. These are the aged, the orphans, the blind and crippled, and the pool of "disemployed" that is created by lack of materials and by priorities. This classification includes the unemployables who have been lifted to the distinction of recognition by modern industrial life and a modernized sense of humanity.

Those in this public assistance group average about five cents a meal for food. They have had to rely upon some public agency for funds to meet their humble living costs. And, during the years of difficult farm surpluses, they have also come to depend upon a more sensible, more humane management of surpluses—their diversion to those who need them but could not otherwise get them.

The farm plant, with around seven million farmers, cannot be managed with such a nicety as to produce to exact goals, in the face of weather and varied local conditions—so there will doubtless continue to be surpluses next year, as there are now of some commodities. But it would be ruinous to morale on the "home front" if we were to abandon machinery established to distribute foods to needy people, just because some surpluses have melted away temporarily. These people are least able to give up the supplements to their food income which are supplied through free school lunches, through the blue stamps of the Food Stamp Plan, or through other methods. I don't believe we want to make food for this group of people utterly dependent on either the whim of a cloud that brings timely rain and a vast harvest, or on the whims of a marketplace suddenly crowded with bidders because Panzer divisions are sweeping over the Ukraine. Abandonment of this group would be reflected in the morale of a hundred training camps where boys from under-privileged homes are spending their first maturing years in the armed service of their country, instead of in factories where they could earn the funds that would at last remove their families from public assistance rolls. But all this is apparent to those who have thought of the necessity of national unity, of a "home front" fortified by a high morale, of good health and decent American minimum nutrition standards. The brunt of higher food costs, no matter how well justified these costs may be, should not be saddled on the group at the bottom of our economic pyramid.

A little later I want to discuss the significance of free school lunches, the stamp plan,

school milk distribution and other methods to meet two future challenges; the sudden challenge when victory over Hitler finally comes with farm production in high gear, and the challenge that is lifted high by the fight we are in—the challenge to make Democracy more meaningful to a lot of folks who have a tough time of it most of the time.

But first I want to complete the picture of the needs farm production must meet. The home needs must be met first, and fortunately they can be met readily. We are now a hard-working nation producing on new high levels. As such we need more food than ever before.

British Food Requirements

The British needs are large—about 25 per cent of their animal protein foods, and this figure is likely to grow. In all, a billion and a half dollars is being concentrated on the purchase of agricultural commodities, predominantly animal protein foods.

We began our buying program in the spring, accelerating rapidly, and this week we passed the \$500,000,000 mark in lend-lease expenditures for farm products. We are continuing our buying and contracting, and this will disburse another \$500,000,000 by the end of February. A third \$500,000,000 of appropriated funds is in a sense already pledged so that farmers can safely continue increasing the production of needed commodities which will be coming from farms and feedlots after March 1st.

In the last eight months our farmers have gotten livestock expansion under way rapidly, firm in the belief that their Government is not fooling in its expressed desire for more livestock products. It isn't, of course. Processors have and are increasing their facilities so that increased supplies are coming through on schedule. Secretary Wickard has proclaimed, in accordance with Congressional authority, his intention to support the prices of cheese, evaporated milk, dry skim milk, pork, eggs, and chickens at a minimum of 85 per cent of parity prices, with funds available to the Department of Agriculture.

We have already supplied the British with large quantities of food, improving the rations available there where the entire food supply is under government control with fixed prices. From the end of last April to October first we shipped to them under the provision of the Lend-Lease Act one billion, six hundred million pounds of agricultural products—much of it in the form of concentrated foodstuffs. Even in concentrated form, these supplies from American farms would fill a solid line of

freight cars stretching from Washington, D. C. through Philadelphia and New York City to the Connecticut State line—a distance of about 250 miles. And that represents only a beginning in the flow of essential foods to those we are supporting in the fight to maintain human freedom on this earth. October shipments, which we plan to announce after December 1st, will show no slackening in this effort. Shipping limitations rather than our ability to supply the foods have been a restraining factor so far. It is, however, going to require a mighty effort on American farms to prevent this situation from being reversed now that repeal of neutrality act shipping restrictions opens the way to increased, more secure transport.

Among the foods which left our docks before October 1st were nearly 10,600 carloads of dairy and poultry products; almost 5,000 carloads of pork; nearly 5,500 carloads of dried and canned fruits and vegetables; more than 2,900 carloads of fats, mainly lard; almost 1,600 carloads of grains and cereals; more than 5,100 carloads of non-foodstuffs, principally cotton and tobacco, and several hundred other carloads of miscellaneous foods.

With our help the British food situation has been improved, aiding war production there—and Hitler's plans for starving those people have gone into the ashcan along with his promises to the Czechs, the Poles, the French, the Norwegians, the Dutch and to the world in general.

We are committed—and an American commitment means business—to supply an important part of British food requirements, and more must be shipped and at a faster rate than thus far. It is clear that the American people, speaking through their President and Congress, have determined to see that the peoples fighting Hitler have the proteins and the vitamins, as well as the munitions, to win. Our program of assistance is an integral phase of our defense program and transcends every other consideration until victory is won.

Post-war Problems

After this war is won, our people and those in other lands are entitled to, and will seek, more group and individual security, defining that word in its broadest sense. We have a big job to do here at home, centering about nutrition alone. We know that even today with all the gains in employment and consumer incomes resulting from national defense activity, large groups of people are not well fed. Indeed, this poor feeding is the

(Continued on page 22)

The Fertilizer Industry's Interest in Livestock Production

By DR. MILTON P. JARNAGIN

Head of the Animal Husbandry Department, The University of Georgia, Athens, Ga.

An address before The National Fertilizer Association Convention,
Atlanta, Georgia, November 18, 1941

FARMING is the biggest business in the southeastern states. A larger proportion of the total population lives on farms in this region than in any other section of the United States. Prosperity, or depression, in this great group of people brings weal or woe to the fertilizer industry. Anything that will improve the economic position of the farmer is at once of vital interest to the fertilizer manufacturer. The comradeship of the two should be as cordial and close as that of David and Jonathan.

During recent years the growth of the livestock industry has been gradual and in some cases has escaped the notice of many not closely associated with the business. To them it will be a surprise to learn that from the standpoint of gross income, livestock annually accounts for more new wealth than the cotton crop.

Table I compiled from data published by the U. S. Department of Agriculture is of interest and significance in this connection.

Table I
Gross Farm Income, 1940, in Seven Southeastern States

	Livestock and Products	Cotton and Seed	All Other Crops
Ga.	\$70,163,000	\$58,313,000	\$73,363,000
N. C.	81,175,000	43,221,000	150,947,000
S. C.	40,092,000	56,930,000	35,703,000
Fla.	26,106,000	1,264,000	92,041,000
Ala.	60,053,000	44,495,000	38,335,000
Miss.	52,391,000	73,115,000	28,442,000
Tenn.	89,435,000	28,837,000	57,837,000
	\$419,415,000	\$306,175,000	\$476,755,000

The figures show the gross income from livestock, cotton and all other crops. These data are proof of the fact that diversification in the southeast has become a reality.

This table shows that the total gross income from livestock including that which was consumed on farms and that which was sold for cash amounted to a little more than 419 million dollars, whereas the total value of cotton and seed produced in these seven states was slightly above 306 million dollars.

The value on all other crops of every description was slightly less than 477 million dollars.

Stated in simplest terms these figures show that for each \$1.00 derived from cotton the farmer had a gross income from livestock of \$1.37. For each \$1.00 derived from all crops except cotton there was a gross income from livestock of 88 cents.

The progressive development of the meat packing industry in Georgia is further evidence of the fact that this section is building a most substantial livestock industry.

Table II
Value of Packing House Products in Georgia

Year	Number of Plants	Value of Products
1933	10	\$ 5,364,000
1935	13	13,477,000
1937	16	24,987,606
1939	16	23,649,314

These figures show that in 1933 the value of all packing house productions was a little more than 5 million dollars. By 1937 the value had risen to practically 25 million dollars. For the year 1939 the total value of packing house productions was a little more than 23½ million dollars. This last year was a period of very cheap prices as compared with 1937 or 1941 and does not indicate a reduction in tonnage of packing house products. With present values, it is quite probable that when the figures are available for 1941 there will be a material increase in the value of packing house products. In the south, a relatively larger proportion of livestock produced is consumed on the farm. During 1940 approximately 53 per cent of the livestock produced in Georgia was consumed on the farm; whereas, for the United States as a whole only 14 per cent of the livestock produced was consumed on the farms.

In spite of this convincing evidence of growth the fact remains that the southeast is an area of under-production for all livestock and livestock products. In order to make the region self-sustaining and at the same time in-

sure an adequate diet for the people in both amount and quality the livestock industry must be very greatly expanded. The Secretary of Agriculture has asked for an increase of 12 per cent in dairy and meat products next year as a part of the National Defense program. The south will do this and more.

Increased Feed Supply a Necessity

No livestock enterprise can succeed except in the presence of an abundance of home grown feed produced at a low cost. Today Georgia and the southeast has a surplus of cottonseed meal and a deficiency of practically every other feed consumed by farm animals. There is no more valuable protein feed than cottonseed meal. On the other hand, if it is fed in amounts beyond that which is required for balancing a ration, it has no more feed value per pound than any other concentrated feed. An intelligent feed production program should logically precede the expansion of the livestock industry. Every new acre brought in use for growing forage or feed is a potential outlet for more fertilizer.

Pastures the Corner Stone

Improved permanent pastures will provide total digestible nutrients at a lower net cost than any other form of feed. In addition to this, the green growing grass and legumes provide an abundance of proteins, minerals and vitamins. Where animals are kept in pastures, livestock sanitation is simpler than under barn conditions. The labor bill is reduced to the minimum. The seven southeastern states need 70 million more acres of improved permanent pastures. All land that will grow grass should be set to permanent pastures rather than reforested. Any critical slopes that can be held by trees can be stabilized with a Bermuda sod provided it has sufficient fertility to grow pasture plants. After the pasture is once established it will pay annual dividends. If the right plant population is established and a reasonable system of fertilizing is followed, the land will constantly grow richer. If a condition ever arises when this land is needed for growing any of the cash crops it will at once be available for this more intensive type of farming. In most of this area there is a deficiency of calcium and phosphorus. The intelligent addition of these two elements can be made with profit. The various experiment stations are carrying on research studies with many pasture plants in the hope of finding grasses and legumes better suited to the soil and climate than those we now have. In most of the Piedmont area, Bermuda grass has

a universal adaptation. In the lighter, sandier soils of the Coastal Plain, Carpet grass has a place. In both sections where there is sufficient moisture and fertility, Dallis grass should be used extensively.

Concentrated effort should be made to bring in all the legumes possible in permanent pastures. Lespedeza and White Dutch Clover are the two plants most generally used. The essential reason for adding calcium and phosphorus is to promote the growth of legumes. They in turn collect atmospheric nitrogen and store it in the soil where it benefits the growth of the grasses.

Pasture management is a subject that demands close study and vigilance on the part of the owner.

Grow More Feed in Winter

The annual production of corn in Georgia has averaged but little above ten bushels per acre for the past quarter century. The yield in the entire southeast is from $\frac{1}{4}$ to $\frac{1}{3}$ as much as the average annual production per acre in the corn belt. With this handicap in yield, plainly the section must find a substitute for a part of the corn. Comparative yields of corn, oats and barley secured by the Agronomy Department of the University of Georgia at Athens indicate that the winter cereals may be 4 times as valuable as corn for providing an abundant cheap source of grain for feeding livestock. The acreage devoted to these cereals should be doubled. If this were done, it would be of interest to the fertilizer industry because the added demand for fertilizer would come in the fall of the year when most plants are comparatively inactive.

The data presented in Table III give the average yields for all varieties of corn, oats, and barley tested in the experimental plots of the College of Agriculture of the University of Georgia at Athens for a 5 year period.

Table III

Feed Values of Corn, Barley and Oats

(5-Year Average on Georgia College of Agriculture Plots)

	Corn	Barley	Oats
A. Yield per acre (lb.)	920	1,880	2,040
B. Total digestive—			
Nutrients per acre (lb.) ..	742	1,480	1,460
C. Protein per acre (lb.)	65	175	192

Line A of Table III shows graphically that from the standpoint of grain produced one acre of oats or barley is a little more than equal to 2 acres of corn.

From the standpoint of total digestible nutrients, Line B shows that one acre of oats or

(Continued on page 24)

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Fertilizer Ratios

At the annual meeting of the American Society of Agronomy held recently in Washington, the Sub-Committee on Fertilizer Ratios made the following report:

"The Committee has given consideration to several questions which have a fundamental bearing on the more efficient production and use of fertilizer, and hence are of interest to both the manufacturers and purchasers of fertilizer.

"The following suggestions and recommendations are made:

"1. That as fast as possible, grades of mixed fertilizer containing less than 8 units of nitrogen, or potash, or of the two together shall be removed from Recommended lists and from price lists.

"2. That in preparing lists of recommended grades, attention be given to a ratio system, with the idea that ultimately all grades, either recommended or sold, shall follow the accepted ratios. (Majority report.)

"3. That for grades in which value is claimed for minor elements, the quantities present be guaranteed.

"4. Only in cases where cooperation between the industry and agronomists fails to result in the offering for sale of grades considered necessary by agronomists, shall grades appear on Recommended lists which are not offered for sale in the state concerned. (Majority report.)

"Data collected by members of the Committee in the various districts in which they are located have permitted of a compilations concerning the grades recommended and sold in the different states.

"It is evident that many states, namely, Oklahoma, Mississippi, Louisiana, Arkansas, Texas, and Alabama, have gone a long way in the reduction of the number of grades offered for sale and in promoting the sale of recommended grades. On the other hand, some states have apparently made little progress in the solving of these problems. In some states, the number of grades sold, and in some cases recommended, that contain less than 20% of plant food, is astounding. *Why waste limited transportation facilities in shipping low grade fertilizer?*

"The large per cent of the total sales which is made up of sales of the '10 best sellers,' in virtually all states, is encouraging and indicates that the number of grades offered for sale may be markedly reduced to the advantage of both the manufacturer and purchaser.

"It is recommended that cooperation between the industry and agronomists be continued in an effort to (a) reduce the number of grades offered for sale in states where the number is large; (b) to promote the sale of Recommended grades; and, (c) to discontinue the sale of grades containing less than 20% of plant food. Closer association of the industry and agronomists and control officials is urged in solving the problems continually arising in connection with the production, licensing, and use of fertilizers.

"The Committee expresses appreciation to control officials, representatives of the industry, and agronomists for the assistance during the year. We shall call upon you for more help."

The Sulphur Industry Moves Ahead*

Sulphur, because of its cheapness, abundance and remarkable properties, affects the production of billions of dollars worth of goods, the employment of millions of workers in American industries, and the welfare and security of all of us. The goods—fertilizers, insecticides and fungicides, rubber, iron and steel, gasoline and lubricants, chemicals, explosives, coal products, paint and pigments, rayon and textiles—all are necessary in peace-time activities and for defense.

In 1916 the United States consumed something over 1,500,000 tons of sulphur from all sources. With our entry into the war, sulphur became one of our government's big problems. Unrestricted submarine warfare and the tremendous demands on transatlantic shipping played havoc with imports. The war industries of the nation had to turn entirely to home resources—to Gulf Coast brimstone, to Canadian and domestic pyrites, to sulphur-containing waste gases from coke plants and smelters.

Despite all efforts, the nation's sulphur production fell short—more than a quarter of a million tons short—of actual minimum requirements. The price of sulphur for government use, direct or indirect, was fixed at twenty-two dollars a ton, and market quotations stood around thirty-five dollars.

The situation today is changed. In the twelve months of 1940 the brimstone industry in Texas and Louisiana succeeded in meeting the greatest demand for sulphur in the history of the United States. Almost 2,560,000 tons

of sulphur were shipped—nearly 100,000 tons more than the previous record in 1937 and 600,000 tons more than the peak consumption of sulphur from all sources during the first World War.

But what about the new peak that lies ahead? What about the estimated 3,000,000-ton requirement for all-out defense in 1941 and 1942? This is an unprecedented amount, but we are proud to be able to say the American sulphur industry has the capacity to supply it. Sulphur production is at an all-time high. Instead of two brimstone mines as in 1916, the American sulphur industry now has five. Stocks of sulphur are near an all-time high. Instead of six months' supplies as in 1916 we now have enough sulphur above ground to last nearly two years. Prices of sulphur are near an all-time low. Instead of selling at about thirty-five dollars a ton as in 1918, we are now supplying the nation at a base price of sixteen dollars a ton. And finally, instead of falling a quarter of a million tons short of minimum defense requirements as we did in 1918, we are now ready to meet the anticipated 3,000,000-ton peak requirement of 1941 and 1942 for the total defense of our United States.

SOUTHERN POWER CURTAILMENT POSTPONED

Because of voluntary savings of electrical energy and the recent extensive rainfall in the power-shortage area, the OPM order calling for a mandatory 30 per cent curtailment of southeastern power is no longer imminent. J. A. Krug of the OPM said that "preliminary estimates show that heavy rainfall during the week-end has considerably improved the power supply situation and that it will be possible to meet defense power requirements on the basis of the present curtailment program."

Mr. Krug states that in the case of seasonal fertilizer plants the average consumption of power in November and December will be used as the basis of consumption if any curtailment should later become necessary. This period is much fairer than the September period originally specified.

Federal Chemical Company has announced the appointment of F. A. Honk as division sales manager of their East St. Louis, Ill., sales division, and of William C. Hunter as assistant sales manager of the same division. Both appointments became effective on November 1st.

* Reprinted from "Brimstone Brevities," November, 1941, issued by Freeport Sulphur Co., New York City.

Note Concerning the Use of Organic Salts of Ammonia as Nitrogen Sources in Plant-food Mixtures¹

By B. E. BROWN² and F. R. REID³

Bureau of Plant Industry, U. S. Department of Agriculture

A PREVIOUS greenhouse study⁴ showed ammonium formate to be a satisfactory source of nitrogen for crop plants—oats, wheat and millet—on different soil types—Caribou loam and Norfolk loamy fine sand. The ammonium formate, used as a source of nitrogen in complete plant-food mixtures, was compared with mixtures in which ammonium sulphate and urea were used individually as the source of nitrogen.

In connection with subsequent greenhouse studies, it was found desirable to compare other organic compounds of ammonium for the same purpose. The writers wanted to obtain a source of nitrogen which would leave no mineral acid residue in the soil.⁵ The organic salts selected for the test with indicated nitrogen content were as follows: ammonium acetate (18.2%), diammonium citrate (12.3%), ammonium lactate (10.1%), ammonium malate (12.5%), ammonium oxalate (19.7%), ammonium succinate

(12.5%) and ammonium tartrate (10.3%). Any variation in nitrogen content of these compounds from the theoretical was due to the presence of some higher form of the compound. The ammonium malate, for example, was chiefly monoammonium malate with some diammonium malate included. These salts were utilized as sources of nitrogen in complete plant-food mixtures and their effect on the growth and yield of millet (german) compared with mixtures having ammonium sulphate and ammonium chloride, respectively, as nitrogen sources.

Greenhouse Pot Culture Studies

Listed below are the main points connected with the pot tests:

1. Soil used: Norfolk loamy fine sand, pH 6.4.
2. Container: One-gallon glazed pots, 5 kilos of soil per pot.
3. Fertilizer mixture: 5-12-6.
4. Fertilizer rate: 2,000 pounds per acre, mixed throughout soil. Equivalent to 5 grams per pot of soil.
5. Crop-plant: German millet, thinned to 10 plants per pot.
6. Replications: Three of each treatment.

Ordinary superphosphate furnished phosphoric acid at the rate of 240 pounds of P_2O_5 per acre; muriate of potash supplied K_2O at

(Continued on page 20)

¹ A greenhouse study made when the writers were connected with the former Division of Soil Fertility Investigations, Bureau of Plant Industry.

² Senior Biochemist, Division of Fruit and Vegetable Crops and Diseases.

³ Assistant Biochemist, Division of Plant Exploration and Introduction.

⁴ Formamide and ammonium formate as nitrogen sources for plants. B. E. Brown and F. R. Reid, Soil Sci. 43: (No. 5) 341-347 (1937).

⁵ Owing to change of duties, the study was discontinued. It was felt, however, that a report on the behavior of the organic salts in this connection might prove of interest to other workers.

BRADLEY & BAKER

FERTILIZER MATERIALS - FEEDSTUFFS

AGENTS - IMPORTERS - BROKERS

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Baltimore, Md.

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1255 West Beaver Street
Jacksonville, Fla.

FERTILIZER MATERIALS MARKET

NEW YORK

Continued Demand for Materials. Nitrate of Soda Prices Continued with Deliveries Restricted to Normal Requirements. Sulphate of Ammonia Deliveries Behind Schedule.

Exclusive Correspondence to "The American Fertilizer."

NEW YORK, December 2, 1941.

The general demand for raw materials is continuing.

Nitrate of Soda

The price of nitrate of soda is now set through 1941. In many cases the buyers have tried to take delivery of a good part of their next spring requirements, but sellers have only been making delivery of approximately such quantities as buyers customarily take. There has been no indication that there will be an increase in price after January 1st, and whereas some buyers feel that they will have to pay a higher price for such later delivery, in our opinion, the present price of nitrate of soda will continue into the new year.

Sulphate of Ammonia

Sulphate of ammonia is being delivered against contracts, but in many cases now sellers are at least one month behind in deliveries, probably due to the deliveries made to take care of the last large lot bought by the British Purchasing Commission.

Potash

Muriate of potash is being delivered against contract, and contract obligations are being fairly well sustained, but no new offerings are in evidence.

Superphosphate

Superphosphate continues firm with indications that this material will become scarcer. Present prices on the Baltimore market are \$9.50 per ton for run-of-pile, basis 16 per cent; and \$10.00 for guaranteed 16 per cent, f.o.b. Baltimore.

Nitrogen Solutions

Nitrogenous material continues to move against contracts previously placed, with few new offerings in the market. Prices at eastern producing points are in the neighborhood of \$2.75 to \$3.00 (\$3.34½ to \$3.64½ per unit N), f.o.b. producers' plant.

BALTIMORE

Market Quiet without Major Changes. Chemical Materials Scarce with Little Resale Material Available.

Exclusive Correspondence to "The American Fertilizer."

BALTIMORE, December 2, 1941.

Activity in the market on fertilizer materials, as is usual at this time of the year, is very quiet, and the only changes have been those materials which are suitable for feed as well as for fertilizer purposes.

Ammoniates.—The market on feeding tankage continues to rule easy and the market on ground material is nominally \$5.10 per unit of nitrogen and 10 cents per unit of B.P.L., f.o.b. Baltimore. Blood is ruling slightly higher, being around \$4.75 per unit of nitrogen.

Nitrogenous Material.—The demand is practically nil, and the market is unchanged, being nominally \$3.75 per unit of nitrogen, f.o.b. Baltimore.

Sulphate of Ammonia.—This material continues scarce with practically no resale offerings on the market. Practically all manufacturers are conserving their stocks for their spring requirements.

Nitrate of Soda.—There is no change in the market and none anticipated over the balance of this year. Chilean material continues to be quoted at \$30.00 per ton, in bulk, with the usual differential for 100 and 200-lb. bags, f.o.b. warehouse, Baltimore.

Fish Scrap.—Last sale of Chesapeake Bay unground menhaden fish scrap was on the basis of \$5.70 per unit of nitrogen and 10 cents per unit of B.P.L., f.o.b. fish factory, in bulk. It is understood that no stocks are being carried over, in consequence of which the market on fish meal, guaranteed 60 per cent protein, continues firm at \$69.00 to \$70.00 per ton, in 100-lb. bags, f.o.b. Baltimore.

Superphosphate.—Due to the heavy demand for sulphuric acid, the production of super-

TO MAKE HIGH-ANALYSIS COMPLETE FERTILIZERS... you must formulate with high-analysis materials!



The manufacture of fertilizers containing 25 to 45% plant food calls for use of high-analysis materials such as Urea-Ammonia Liquor (UAL). Ammoniation of such grades with UAL makes possible:

Use of more dolomite, thus increasing content of calcium and magnesium and reducing acidity of the resultant mixture . . .

Use of part ordinary superphosphate instead of all triple superphosphate, thus effecting a further saving in cost.

The nitrogen in UAL is completely available, leaching resistant, and relatively low in unit cost!

UAL-A UAL-B UAL-37

Specific information, giving typical formulas for making both high-analysis and single-strength mixtures with UAL, together with facts about the advantages and methods of cooling fertilizers for more rapid curing and superior condition, will be sent on request.



**E. I. DU PONT DE NEMOURS & CO. (INC.)
AMMONIA DEPARTMENT • WILMINGTON, DELAWARE**

MENTION "THE AMERICAN FERTILIZER" WHEN WRITING TO ADVERTISERS.

phosphate in this market has declined and, therefore, no large stocks are being accumulated. The market remains unchanged at \$9.50 for run-of-pile, and \$10.00 for flat 16 per cent grade, both in bulk, f.o.b. Baltimore, subject to change without notice.

Bone Meal.—There is no change in the position, and 3 and 50 per cent steamed bone meal is still nominally quoted at \$37.00 to \$38.00 per ton, with 4½ and 47 per cent raw bone meal ranging from \$37.50 to \$38.00 per ton of 2,000 lb., f.o.b. Baltimore.

Potash.—The market is practically at a standstill, and all domestic manufacturers are now busy delivering against contracts previously booked. It is hoped that with the increased domestic production during the coming spring there will be ample tonnage to take care of nominal requirements of American fertilizer manufacturers.

Bags.—The market on burlap for spring delivery is ruling considerably easier, and ranges from \$175.50 down to \$172.25, according to time of shipment during the spring season, for plain, new, 10-oz. bags, basis 40 cut 54 in., f.o.b. Baltimore.

ATLANTA

No Significant Changes in Market. Most Manufacturers Covered for Spring Requirements. Advance in Superphosphate Expected.

Exclusive Correspondence to "The American Fertilizer."

ATLANTA, December 1, 1941.

The market on fertilizer materials has not seen any significant changes within the past several weeks. The Fertilizer Convention held here in Atlanta the middle of November was well attended and the industry had an opportunity of checking up on supplies, priorities and the potential demand that everyone is expecting during the coming spring season. Since that

time, business has been quiet and buyers seem to have adopted a waiting attitude. Of course, for the most part, the trade is fairly well covered as far as their major requirements are concerned and it is now more or less a question of fill-in supplies to balance out with.

Superphosphate is in a strong technical position and it would seem that higher prices are in the offing.

The markets are as follows:

Blood.—South American, \$4.25 (\$5.16½ per unit N), c.i.f. Domestic Chicago packers; \$4.70 (\$5.71½ per unit N).

Domestic Nitrogenous Tankage.—\$2.35 (\$2.85½ per unit N), western producing points.

Imported Tankage.—\$4.40 (\$5.35 per unit N) and 10 cents, c.i.f.

Menhaden Machine Dried Scrap.—\$64.00, Carolina producing points, in sellers' bags.

Acidulated Fish.—Nothing presently offered.

Sulphate of Ammonia.—Demand strong with limited offerings.

Nitrate of Soda.—No change.

Cottonseed Meal.—Prime 8 per cent, \$36.50, Memphis; Southeastern mills, \$40.00.

CHARLESTON

Advances Recorded in Some Materials. Scarcity in Superphosphate and Sulphate of Ammonia Noted.

Exclusive Correspondence to "The American Fertilizer."

CHARLESTON, December 2, 1941.

Nitrogenous.—This material has advanced. Quotations are now around \$2.95 to \$3.10 (\$3.58½ to \$3.77 per unit N), delivered Southeastern ports for winter shipment.

Blood.—This material is priced around \$4.20 (\$5.10½ per unit of N), bagged, c.i.f., where

Manufacturers' Sales Agents for **DOMESTIC**

Sulphate of Ammonia

Ammonia Liquor

::

Anhydrous Ammonia

HYDROCARBON PRODUCTS CO., INC.

500 Fifth Avenue, New York

freights can be obtained. Domestic material is quoted at \$4.50 (\$5.47 per unit N), bulk, f.o.b. Chicago.

Fish Meal.—Offers are scarce and quotations are \$70.00 per ton, f.o.b. Norfolk.

Cottonseed Meal.—8 per cent grade, \$38.00, Augusta; \$36.00, Memphis.

Superphosphate.—This continues to be hard to obtain.

Bone Meal.—4½ and 50 per cent grade is offered at \$39.00 per ton, c.i.f. Tampa.

Sulphate of Ammonia.—This continues extremely scarce.

TENNESSEE PHOSPHATE

Water Shortage Partially Averted by Rains. Construction Work Proceeding. Higher Prices for Ground Rock Expected.

Exclusive Correspondence to "The American Fertilizer."

COLUMBIA, TENN., December 1, 1941.

One recent series of heavy rains was worth several million dollars to the wheat and other small grains, fall-sowed legumes and pastures, while much of the apprehension regarding contemplated further curtailment of power for the phosphate plants has been at least postponed, even though it still threatens. Flow of creeks supplying washing water is still near the minimum.

Construction work on the large TVA plants is proceeding rapidly. The L. & N. R.R. has constructed a 16-car siding on the main line between West Harpeth and Thompson's Station for the use of the Federal Chemical Co., in handling rock from their recently purchased properties in that section. The new intake part of the Hoover & Mason washing plant is now in operation, with very great satisfaction to its designers and builders.

Another transfer of something over 60 acres in Grays Bend of Duck River has been filed

for record from the New Blue Grass Phosphate Co. to International Agricultural Corporation at the register's office of Hickman Co. Discussion is revived as to how the I.A.C. will transport the phosphate from Centerville district to their plant at Mt. Pleasant, or whether, as reported, they will build another plant near Centerville, or in Gray's Bend east of Centerville where one of the proposed TVA dams in Duck River is to be located.

Shipments of ground rock to farmers for direct application during November showed an increase of about 25 per cent over same month of 1940. The whole of 1941 will show an increase in this consuming channel of about 28 per cent.

The largest seller of ground rock for direct application has already arranged to advance its prices very considerably, bringing them back almost to the level of 1931-32, when drastic reductions were made due to the depression. They will also considerably change the set-up of sales and will make prices the same in Illinois as in other states. Other sellers have not as yet announced their prices but it is presumed that the same reasons necessitating an advance will prevail with all.

It is highly improbable that the volume of previous years can possibly be shipped during 1942, due to priorities, etc.; hence the enormous increases of cost since 1932 can no longer be absorbed.

PHILADELPHIA

Better Inquiry but No Increase in Actual Trading. Materials Scarcity Expected.

Exclusive Correspondence to "The American Fertilizer."

PHILADELPHIA, December 3, 1941.

There seems to be an improvement in inquiry for various materials but actual trading has not increased. Indications are that there is a scarcity in almost all lines.

BACK TO THE LAND

Extracted from deposits beneath the Gulf Coast
at Port Sulphur, La., and Freeport, Tex., sulphur
—better than 99½% pure—goes back to the
land in fertilizer to help solve soil problems.

FREEPORT SULPHUR COMPANY
122 East 42nd Street, New York City



**WE'RE DOING
OUR BEST...
TO HELP AGRICULTURE
DO ITS BEST**

Fruitful harvests? They're a "must" today as never before! Ample food supplies are the very basis of the nation's effort. And to help soils throughout the country do their best job, American agriculture is making the heaviest demands upon the domestic potash industry in its history. As an important factor in this industry, we recognize our responsibility to see that agriculture shall not want for quality potash. Today management, personnel and equipment of the United States Potash Company are working together as a close-knit unit to assure adequate supplies of this major plant food in the days ahead.

UNITED STATES POTASH COMPANY
Incorporated
30 Rockefeller Plaza, New York

REG. U. S. PAT. OFF.



HIGRADE MURIATE OF POTASH
62/63% K₂O
Also 50% K₂O Grade
MANURE SALTS
22% K₂O Minimum

MENTION "THE AMERICAN FERTILIZER" WHEN WRITING TO ADVERTISERS.

Sulphate of Ammonia.—This material is practically unobtainable at first hand, and small resale lots are held at high figures.

Blood and Tankage.—Ammoniates are scarce and, while prices are somewhat easier, are still beyond range for fertilizer purposes.

Bone Meal.—There has been some little inquiry but desirable stocks are limited.

Low Grade Ammoniates.—These are obtainable in only small quantities and at prices almost equivalent to tankage and blood basis.

CHICAGO

Market Steady on Fertilizer Organics with Higher Prices Asked. Feed Market Still Slow.

Exclusive Correspondence to "The American Fertilizer."

CHICAGO, December 1, 1941.

The market remains in a steady-to-firm position. Additional sales of nitrogenous tankage are reported, causing sellers to maintain their asking prices at slightly advanced figures. Southern demand for organics has as yet not developed to any extent.

The feed market continues slow and draggy, with neither sellers nor buyers showing any particular desire to trade.

Nominal prices are as follows: High grade ground fertilizer tankage, \$3.50 to \$3.75 (\$4.25 $\frac{1}{2}$ to \$4.56 per unit N) and 10 cents; standard grades crushed feeding tankage, \$4.60 to \$4.75 (\$5.59 to \$5.77 $\frac{1}{2}$ per unit N) and 10 cents; blood, \$4.50 to \$4.60 (\$5.47 to \$5.59 per unit N); dry rendered tankage, \$1.00 to \$1.05 per unit of protein, Chicago basis.

PARSONS AND HOWELL TO HEAD SOIL IMPROVEMENT COMMITTEE

At a meeting of the Soil Improvement Committee of the National Fertilizer Association in Atlanta on November 17th, Henry S. Parsons, of The Naco Fertilizer Co., was re-elected Chairman of the Committee. Mr. Parsons agreed to serve, provided he could have someone to assist him, and J. A. Howell, of the Virginia-Carolina Chemical Corp., was elected co-chairman for the coming year.

SNEAD JOINS POTASH CO. OF AMERICA STAFF

On November 15th, W. A. (Alex) Snead joined the staff of the Potash Company of America as sales representative for the States of North and South Carolina, succeeding T. W. Davies who had resigned. Mr. Snead will make his headquarters at Wilmington, N. C.

BARRETT COMPANY CHANGES TITLE

The Barrett Company, which is a wholly owned subsidiary of the Allied Chemical & Dye Corporation, has now been consolidated with the parent corporation, as of December 1st. The business will be conducted under the title "The Barrett Division, Allied Chemical & Dye Corporation." Except for the change of name, operations will continue as usual by the same personnel and all contracts will be performed by the successor company.

NEW NAME FOR I. A. C.

The International Agricultural Corporation has changed its corporate name to International Minerals & Chemical Corporation. The change, which became effective on December 1st, was made in order to more accurately describe the scope of their business. While expansion in various mineral and chemical lines has been started, the change will in no way lessen the emphasis which the company will make on its fertilizer and phosphate rock lines.

CLASSIFIED ADVERTISEMENTS

Advertisements for sale of plants, machinery, etc., and for help and employment, in this column, same type as now used, 60 cents per line, each insertion.

FOR SALE

FOR SALE—FERTILIZER PLANT. Stedman Dry Mixing Plant complete with Bag Printing Press. Capable of turning out as much as 10,000 tons of mixed goods per season. Address, VICTOR COTTON OIL COMPANY, GAFFNEY, S. C.



Stedman
Founded 1854

FERTILIZER PLANT EQUIPMENT

Dependable for Fifty Years

All-Steel
Self-Contained
Fertilizer
Mixing Units

Batch Mixers—
Dry Batching
Pan Mixers—
Wet Mixing

Swing Hammer
and Cage Type
Tailings
Pulverizers

Vibrating Screens
Dust Weigh
Hoppers
Acid Weigh Scales

STEDMAN'S FOUNDRY & MACHINE WORKS 505 Indiana Ave. AURORA, INDIANA, U.S.A.

MENTION "THE AMERICAN FERTILIZER" WHEN WRITING TO ADVERTISERS.

FERTILIZER MATERIALS

LET US QUOTE
YOU ON YOUR
REQUIREMENTS
OF THESE
MATERIALS

+

PHOSPHATE ROCK

+

SUPERPHOSPHATE

+

DOUBLE

SUPERPHOSPHATE

+

NITRATE of SODA

+

SULPHURIC ACID

+

SULPHATE of

AMMONIA

+

BONE MEALS

+

POTASH SALTS

+

DRIED BLOOD

+

TANKAGES

+

COTTONSEED MEAL

+

BONE BLACK

+

PIGMENT BLACK

+

SODIUM

FLUOSILICATE



ARMOUR FERTILIZER WORKS

General Offices: Walton Building, Atlanta, Ga.

Division Sales Offices:

Albany, Ga.	Columbus, Ga.	New Orleans, La.
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Birmingham, Ala.	Houston, Texas	San Juan, P. R.
Chicago Heights, Ill.	Jacksonville, Fla.	Sandusky, Ohio
Cincinnati, Ohio	Montgomery, Ala.	Wilmington, N. C.
Columbia, S. C.	Nashville, Tenn.	

**ORGANIC SALTS OF AMMONIA IN
PLANT-FOOD MIXTURES**

(Continued from page 12)

the rate of 120 pounds per acre; and the different nitrogen sources furnished 100 pounds of nitrogen per acre, making these applications equivalent to a ton of 5-12-6. A 0-12-6 mixture (no nitrogen) served as a control. To all mixtures magnesium sulphate (Kieserite) was added. The different plant-food mixtures were incorporated with the soil by means of a me-

chanical mixer. The millet growths obtained are reported in Table 1 on an oven-dry weight basis.

Discussion of Results

The millet responded well to all of the nitrogen compounds, with some variations as may be noted. Ammonium sulphate proved to be a better source of nitrogen than ammonium chloride in this experiment. Results obtained with the organic salts compare more closely with those for ammonium chloride than for

Table 1
*Results with German Millet Comparing Organic and Inorganic Salts of Ammonia as
Nitrogen Sources in Complete Plant-food Mixtures**

Actual and relative weights of millet, 30 plants,
grown on Norfolk loamy fine sand

Ammonium source in 5-12-6 mixture (Nitrogen basis)	Entire plants, including heads		Weight of heads from 30 plants	
	Actual grams	Relative	Actual grams	Relative
P-K (0-12-6)	49.9	100	8.15	100
Ammonium chloride + (P-K)	69.1	138	24.1	296
Ammonium sulphate + (P-K)	80.6	162	26.6	326
Ammonium acetate + (P-K)	71.5	143	25.1	308
Ammonium citrate + (P-K)	69.3	139	21.75	267
Ammonium lactate + (P-K)	80.7	162	28.25	347
Ammonium malate + (P-K)	77.9	156	25.4	312
Ammonium oxalate + (P-K)	70.1	140	23.0	282
Ammonium succinate + (P-K)	76.2	153	25.05	307
Ammonium tartrate + (P-K)	74.5	149	25.55	313

* Duration of test, 57 days.

Here's a PROFIT-MAKER For Firms that sell to Vegetable and Fruit Growers

If a salesman walked into your office and told you he had a product that will earn you a good profit—that is easy to sell—that means a steady business in repeat sales—that is nationally advertised—you would probably be interested and would want to ask questions.

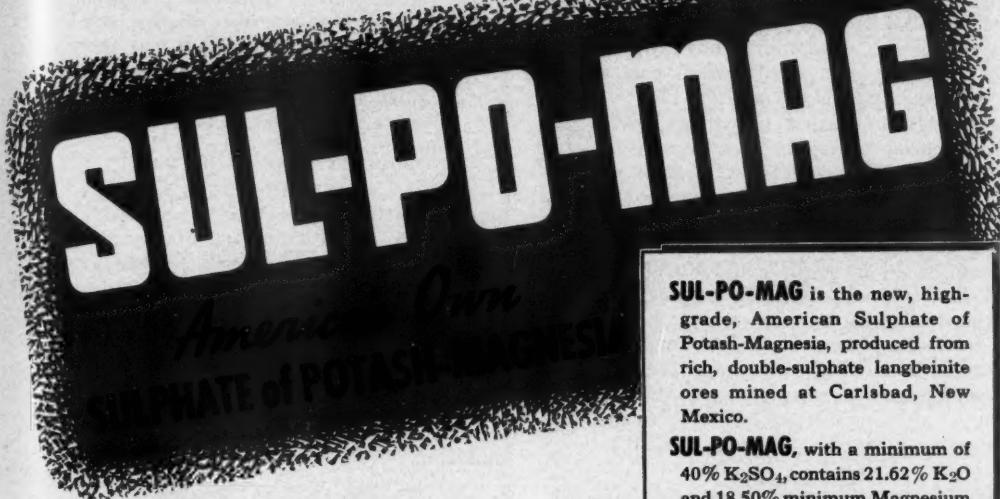
This advertisement is that salesman.

The product is Pyrocide Dust, the fastest growing insecticide in America today. Introduced in 1935, it has been tested and used for more than six years with constantly growing acceptance.

Pyrocide Dust is now being sold by our licensees at a profit. There is no supply problem. The price for 1942 will actually be lower than in 1941. The license agreement under which we operate is being offered to reputable firms with established credit rating. A letter from you today will bring the following helpful information: facts about our field work with experiment stations, county agents and growers, history of the success of Pyrocide Dust, a unique selling plan that our licensees like, and advertising and sales promotional helps. No obligation. Write Mr. McLaughlin, McLaughlin Gormley King Co., Minneapolis, Minnesota.

McLAUGHLIN GORMLEY KING CO. - Minneapolis, Minn.

The Most Popular New Material on the Market



SUL-PO-MAG is a business builder you can use with confidence. Farmers have known and used Sulphate of Potash-Magnesia for many years. When you tell them that your fertilizer contains a new and better All-American form of this familiar product, you are building tonnage that is not dependent upon the uncertainty of foreign imports.

Fertilizer manufacturers have been quick to recognize the advantages of using SUL-PO-MAG to establish sales leadership for premium mixtures. There is a big demand for SUL-PO-MAG in the trade today. Its high Potash and Magnesia content...its low price...its excellent mechanical condition...its solubility...its easy-mixing qualities...and its crop-producing power—all combine to make it the most popular new material on the market.

It will pay you to get all the information on SUL-PO-MAG before figuring your requirements for the season just ahead. Ask the Union Potash representative who calls on you...or, communicate with our nearest office.

SUL-PO-MAG is the new, high-grade, American Sulphate of Potash-Magnesia, produced from rich, double-sulphate langbeinite ores mined at Carlsbad, New Mexico.

SUL-PO-MAG, with a minimum of 40% K_2SO_4 , contains 21.62% K_2O and 18.50% minimum Magnesium Oxide—all water soluble and completely available to plants.

SUL-PO-MAG is offered at an attractive, low price, comparing favorably with the going price of water-soluble Magnesium plus the price of K_2O in other grades of Potash.

SUL-PO-MAG is an excellent mixer. Its granular form and superior mechanical condition—with dry, well-formed crystals—make it much less subject to caking. Some fertilizer manufacturers use it directly in their mixture instead of in the base goods.

SUL-PO-MAG is neutral in reaction and the Potash and Magnesia remain entirely water soluble when incorporated in fertilizer mixtures. Any quantity may be used in mixtures without causing reversion of P_2O_5 or loss of Ammonia.



UNION POTASH & CHEMICAL COMPANY, Inc.

20 North Wacker Drive, Chicago, Ill.

61 Broadway, New York, N. Y. • Volunteer Building, Atlanta, Ga.

...the only All-American company now producing a complete line of Potash Salts: Muriate of Potash 60% K_2O , Muriate of Potash 50% K_2O , Granular Muriate of Potash 50% K_2O , Manure Salts 30% K_2O , Sulphate of Potash 90/95% K_2SO_4 , and SUL-PO-MAG—America's Own Sulphate of Potash-Magnesia—minimum 40% K_2SO_4 18.50% MgO .

ammonium sulphate. In no case where the organic salts were employed was the yield of millet below the ammonium chloride mixture. In the case of ammonium sulphate, the response of the millet was greater in all comparisons, except the ammonium lactate. The latter salt produced the heaviest growth of heads. The development of heads, as measured in terms of increases over the 0-12-6 control, was relatively much greater than was obtained with the stalks. With respect to ammonium malate, ammonium succinate, and ammonium tartrate, the drop in yield in comparison with the ammonium sulphate mixture was slight; this was particularly true of the millet heads.

In checking the pH at the termination of the tests (pH initially 6.4), it was found that no measurable differences were established with any of the organic salts. The inorganic salts gave a drop in pH averaging about 0.5.

Summary

Greenhouse pot studies were made to evaluate ammonium acetate, diammmonium citrate, ammonium lactate, ammonium malate, ammonium oxalate, ammonium succinate and ammonium tartrate as sources of nitrogen for plant-food purposes. German millet was used as the indicator plant. Compared with ammonium chloride, all organic sources proved superior; compared with ammonium sulphate, only ammonium lactate proved equal in crop-producing capacity. Other salts—ammonium malate, ammonium succinate and ammonium tartrate—gave results nearly as good as ammonium sulphate.

The good performance of several of the organic salts and, further, the consideration that they leave no mineral acid residue, suggest their suitability for greenhouse studies where minimum changes in pH are desired.

It is likely that, aside from a certain amount of ammonium radicle absorbed as such, the

nitrogen in the different organic salts tested under the optimum conditions prevailing in the greenhouse is converted without much loss of time to the nitrate form. This may serve to account partly for the good response to these organic salts of ammonia.

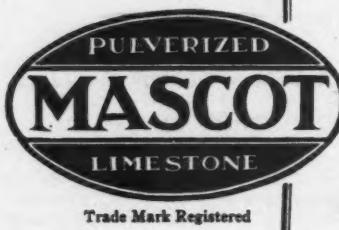
FOOD IN PEACE AND WAR

(Continued from page 7)

reason why many of these people can't get into the stream of individual opportunity. It is a vicious circle—malnutrition prevents otherwise able citizens from maintaining adequate health; through poor health they are unable to take their place as workers; without work they are unable to obtain sufficient income to buy the food to combat malnutrition. It isn't all as simple as that, but the general situation accounts for enough cases to make our shame abundant.

Distribution programs such as free school lunches, the Stamp Plan, and low-cost milk for children are a partial answer to our modern paradox of want in the midst of plenty. They point to the possibilities of more complete answers. They demonstrate that we are advancing, progressing somehow from the singular crudity of wasting farm surpluses while both farmer and consumer starved. They show that we recognize that relating want to plenty when extremes are reached can no more be left to "business as usual" than it is possible for "business as usual" to be maintained in the anguish of an emergency war production effort.

Such programs provide farmers with a wider market that helps to bring a fair return on their full production. At the same time they get more food to people who simply cannot afford to buy an adequate diet. There is a good deal of variation in farm production and in prices, and consequently in what constitutes



MAGNESIUM LIMESTONE

"It's a Dolomite"

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MENTION "THE AMERICAN FERTILIZER" WHEN WRITING TO ADVERTISERS.

For over 20 years we have
served the Fertilizer Industry

ACID-PROOF CEMENT

Ready Mixed—For Immediate Use
Packed in 250-lb. Steel Drums
Dry-Packed in 100-lb. Bags

CHEMICAL PUTTY

Stop Acid, Gas and Water Leaks

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Graded to Size

FILTER GRAVEL, FILTER SAND

ACID VALVES

SOUTHERN DISTRIBUTORS OF
CALGON (Sodium Hexametaphosphate)

ACID BRICK, SPIRAL RINGS

Charlotte Chemical Laboratories
INCORPORATED

Laboratories, Plant, Office
CHARLOTTE, N. C.

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Fertilizer plants all over the country—large and small—state their needs and we meet them. Large stocks of seasoned materials and ample modern production facilities enable us to make prompt shipments.

TRIPLE SUPERPHOSPHATE

46 to 48% Available Phosphoric Acid

We also manufacture

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Division
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716 Investment Bldg.

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Sales Agents:
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New York, N. Y.

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.... WHEN BORON IS NEEDED TO CORRECT A DEFICIENCY OF THIS IMPORTANT SECONDARY ELEMENT

Agricultural authorities have shown that a lack of Boron in the soil can result in deficiency diseases which seriously impair the yield and quality of crops.

When Boron deficiencies are found, follow the recommendations of local County Agents or State Experiment Stations.

Information and references available on request.

AMERICAN POTASH & CHEMICAL CORPORATION

70 PINE STREET, NEW YORK CITY

Pioneer Producers of Muriate of Potash in America

See Page 4

a price-depressing surplus. There is a good deal of variation, too, in the foods that can be used to bring about a balanced and adequate diet. But if and when such variation is lessened temporarily, we cannot become slaves to a set pattern for operating a program to such an extent that we abandon the group which is relying on the device itself—whether they be farmers at the supply end, or the public assistance group at the consuming end.

After the present emergency passes and we come face to face with some terrific needs for adjustment, these distribution programs will be of great importance to national welfare. They can greatly help farmers in readjusting production—a job that may be painful in the extreme. They will help cushion the social damage that will be done by the inevitable slack in employment, as the focus of industrial production switches from war materials to peace needs. They will help, if adequately financed and supported, to keep a floor under the nation's physical health; and assist in keeping the nation from repeating a recently revealed mistake—neglect of our health to a point where nearly one-half of the young men drafted could not meet the physical fitness test.

We can make the switch-over from war to peace in an orderly way, or we can permit it to become a rout. We don't—if we are wise—throw the ladder away when we climb on top of a roof to put out a fire. Machinery that will help us make a decent transition from war to peace shouldn't be scrapped. We shouldn't forget that there are some folks about half-way up the ladder who can't climb further and many others who can't in their present condition help very much in fighting the kind of fire Hitler started.

There is no doubt that if every citizen in this country is to have adequate nutrition the acreage of food crops will have to be expanded—our food distribution system, including that which now operates without direct subsidy, will have to be improved. Adequate diet is an ideal for which all of us can work to build a stronger and healthier America. From this ideal and the ability to do something about it will spring our economic security after the peace is won.

In the past, too many people in our country have been ill-fed, ill-clothed, and ill-housed. And even though the number has decreased as our national defense program has gone forward, we still have too many who lack the opportunity to become self-sufficient. Working out a more permanent answer to this key social and economic problem is a challenge that

must not go unheard despite the war trumpets. The future isn't in the habit of taking care of itself.

In the words of the joint statement made by President Roosevelt and Prime Minister Churchill following their meeting at sea, we "hope to see established a peace which will afford all nations the means of dwelling in safety within their own boundaries, and which will afford assurance that all the men in all the lands may live out their lives in freedom from fear and want."

Those words, "freedom from fear and want," do not form an empty phrase. They have a world of meaning, meaning that is crystal-clear in Europe today, meaning that can be translated into action in this country. Hitler, more than any other person in any time, stands in the way of our realization of this objective. It will take our full energies and spirit—with a full holiday for over-confidence—to defeat him. And likewise it will take our full energies and spirit—with over-confidence out on another holiday—to translate to full reality the ultimate objective, "freedom from fear and want."

LIVESTOCK PRODUCTION

(Continued from page 9)

barley is nearly equal to 2 acres of corn. The greater content of protein and minerals gives added feeding value to the winter cereals.

Line C indicates that an acre of barley produced 2.7 times as much digestible crude protein as an acre of corn, and an acre of oats practically 3 times as much.

The facts set out in these tables do not tell but half the story of the potential benefits to be derived from substituting oats and barley for corn. The winter cereals, because they are dense growing and sod forming, give the maximum protection to the land during the winter months when the rainfall is the

Season's Greetings

THE DICKERSON COMPANY
Incorporated
Drexel Building, Philadelphia, Pa.

• SOUTHERN PHOSPHATE CORPORATION •

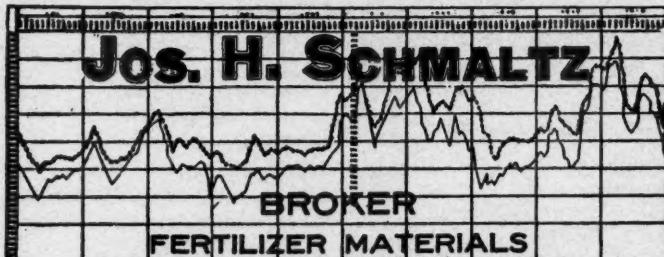
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Tankage
Blood
Bone
All
Ammoniates

OFFICIAL BROKER FOR MILORGANITE

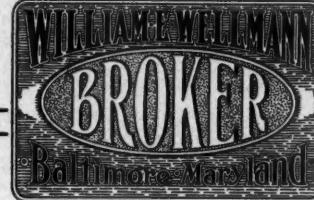
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Production
Recovery
Concentration

Whether your production requirements involve large or small quantities, consult the CHEMICO engineers for authoritative advice and recommendations. CHEMICO designs, remodels and builds complete acid and fertilizer plants, and CHEMICO recommendations are based on 26 years of specialized experience. Your inquiry is invited, and will involve no obligation.

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CHEMICO PLANTS are
PROFITABLE INVESTMENTS



Specializing in

Sulphate of Ammonia
Low Grade Ammoniates
Superphosphate
Sulphuric Acid
Bags

Inquiries and offerings
invited

KEYSER BUILDING

heaviest. The corn crop exposes the land to serious depletion through leaching and erosion. The winter cereals do not compete with cotton, tobacco, or peanuts for land, man or mule labor. The cereals are cheap crops to plant and harvest. Corn is an expensive crop to plant, cultivate and harvest. There is less weather gamble in growing the cereals than corn because there is usually an abundance of rain for all winter crops, but damaging droughts are far too common during the summer growing season.

It is safe to state that it will cost twice as much to make an acre of corn as it will cereals. With the yield from the latter twice as great, it would appear possible to produce a pound of total digestible nutrients at $\frac{1}{4}$ the cost as in corn. Barley should be planted on the more fertile land and oats on the less fertile land.

Grain Sorghums Have a Place

Experimental work at the University of Georgia and observation in the field are convincing evidence that the grain sorghums can be used for increasing the amount and cheapening the cost of feed for livestock. Apparently they have the possibility of producing from $1\frac{1}{2}$ to 3 times as much grain per acre as corn. This is particularly true during dry years.

The fertilizer industry rendered a substantial service to agriculture in helping to establish the present cash crops of the south. It has a greater opportunity of service in helping to establish a feed production program including grain, forage and permanent pastures.

An expanded feed program will put every loafing acre in the southeast to work. When this has been accomplished, increased livestock production will bring a greater prosperity and happiness to the farming districts in the southeast than they have ever known.

OCTOBER SULPHATE OF AMMONIA

The figures for October production of by-product sulphate of ammonia and ammonia liquor, as compiled by the U. S. Bureau of Mines, show an increase of 2.8 and 4.6 per cent respectively over the previous month. Shipments of sulphate of ammonia increased by about 7 per cent, while stocks on hand at the end of the month were 14 per cent smaller than they were on September 30th.

With the approach of the spring season, there has been a steady increase in shipments, with a corresponding decrease in stocks on hand.

	Sulphate of Ammonia Tons	Ammonia Liquor Tons NH ₃ Content
Production:		
October, 1941	63,373	2,654
September, 1941	61,676	2,537
October, 1940	63,898	2,584
January-October, 1941	618,406	26,329
January-October, 1940	590,822	23,292
Shipments:		
October, 1941	69,026	3,024
September, 1941	64,594	2,800
October, 1940	60,737	2,717
Stocks on Hand:		
October 31, 1941	34,057	1,054
September 30, 1941	39,660	837
October 31, 1940	42,981	1,836
September 30, 1940	40,303	1,185

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CHILEAN NITRATE OF SODA

Nitrogenous Materials

Blood and Fertilizer Tankage

Bone Meals

Manganese Sulphate

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RENDERED TANKAGE**

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You've saved
two million lives
...so far!

SINCE 1907, when the fight began, the tuberculosis death rate has been reduced 75%! — by people like you buying Christmas Seals. More than two million lives have been saved.

But the battle against this scourge must go on. *Tuberculosis still kills more people*

between the ages of 15 and 45 than any other disease.

Yet it is possible to eliminate completely this enemy of mankind. Our weapons are Research, Education, Prevention, Control—made possible by your use of Christmas Seals. Get them today.



Buy
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SEALS**

The National, State
and Local Tuberculosis
Associations
in the United States

BUYERS' GUIDE

A CLASSIFIED INDEX TO ALL THE ADVERTISERS IN "THE AMERICAN FERTILIZER"



This list contains representative concerns in the Commercial Fertilizer Industry, Including
fertilizer manufacturers, machinery and equipment manufacturers, dealers in and manufacturers of commercial fertilizer materials and supplies, brokers, chemists, etc.
For Alphabetical List of Advertisers, see page 33.



ACID BRICK

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.

ACID EGGS

Chemical Construction Corp., New York City.

ACIDULATING UNITS

Chemical Construction Corp., New York City.
Sackett & Sons Co., The A. J., Baltimore, Md.

AMMO-PHOS

American Cyanamid Co., New York City.

AMMONIA—Anhydrous

Barrett Company, The, New York City.
DuPont de Nemours & Co., E. I., Wilmington, Del.
Hydrocarbon Products Co., New York City.

AMMONIA LIQUOR

Barrett Company, The, New York City.
DuPont de Nemours & Co., E. I., Wilmington, Del.
Hydrocarbon Products Co., New York City.

AMMONIA OXIDATION UNITS

Chemical Construction Corp., New York City.

AMMONIATING EQUIPMENT

Sackett & Sons Co., The A. J., Baltimore, Md.

AMMONIUM NITRATE SOLUTIONS

Barrett Company, The, New York City

AUTOMATIC ELEVATOR TAKEUPS

Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

BABBITT

Sackett & Sons Co., The A. J., Baltimore, Md.

BAGS AND BAGGING—Manufacturers

Bagpak, Inc., New York City.
Bemis Bro. Bag Co., St. Louis, Mo.

BAGS—Cotton

Bemis Bro. Bag Co., St. Louis, Mo.

BAGS—Paper

Bagpak, Inc., New York City.

BAGS—Waterproof—Manufacturers

Bemis Bro. Bag Co., St. Louis, Mo.

BAGS—Dealers and Brokers

Ashcraft-Wilkinson Co., Atlanta, Ga.

Baker & Bro., H. J., New York City.

Huber & Company, New York City.

Jett, Joseph C., Norfolk, Va.

Taylor, Henry L., Wilmington, N. C.

Wellmann, William E., Baltimore, Md.

BAGGING MACHINES—For Filling Sacks

Atlanta Utility Works, East Point, Ga.

Bagpak, Inc., New York City.

BAG PILERS

Jeffrey Manufacturing Co., The, Columbus, Ohio.

Link-Belt Company, Philadelphia, Chicago.

BEARINGS

Jeffrey Manufacturing Co., The, Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.

Sackett & Sons Co., The A. J., Baltimore, Md.

BELT LACING

Sackett & Sons Co., The A. J., Baltimore, Md.

BELTING—Chain

Atlanta Utility Works, East Point, Ga.
Jeffrey Manufacturing Co., The, Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

BELTING—Leather, Rubber, Canvas

Jeffrey Manufacturing Co., The, Columbus, Ohio.
Sackett & Sons Co., The A. J., Baltimore, Md.

BOILERS—Steam

Atlanta Utility Works, East Point, Ga.

BONE BLACK

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Huber & Company, New York City.

BONE PRODUCTS

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Schmalz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

BORAX AND BORIC ACID

American Potash and Chem. Corp., New York City.
Pacific Coast Borax Co., New York City.

BROKERS

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Dickerson Co., The, Philadelphia, Pa.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
Keim, Samuel L., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
Schmalz, Jos. H., Chicago, Ill.
Taylor, Henry L., Wilmington, N. C.
Wellmann, William E., Baltimore, Md.

BUCKETS—Elevator

Jeffrey Manufacturing Co., The, Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

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Bentley's Code

Cable Address "HLTAYLOR"

NORTH CAROLINA BANK BLDG., WILMINGTON, N. C.

Menhaden Fish Products

and

Fertilizer Materials

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BUYERS' GUIDE

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Advertisers, see page 28

BUCKETS—For Hoists, Cranes, etc. Clam Shell, Orange Peel, Drag line, Special; Electrically Operated and Multi Power

Hayward Company, The, New York City.

Link-Belt Company, Philadelphia, Chicago.

BURNERS—Sulphur

Chemical Construction Corp., New York City.

BURNERS—Oil

Monarch Mfg. Works, Inc., Philadelphia, Pa.

Sackett & Sons Co., The A. J., Baltimore, Md.

CABLEWAYS

Hayward Company, The, New York City.

CARBONATE OF AMMONIA

American Agricultural Chemical Co., New York City.

DuPont de Nemours & Co., E. I., Wilmington, Del.

CARS—For Moving Materials

Link-Belt Company, Philadelphia, Chicago.

Sackett & Sons Co., The A. J., Baltimore, Md.

Stedman's Foundry and Mach. Works, Aurora, Ind.

CARTS—Fertilizer, Standard and Roller Bearing

Atlanta Utility Works, East Point, Ga.

Sackett & Sons Co., The A. J., Baltimore, Md.

CASTINGS—Acid Resisting

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.

Duriron Co., Inc., The, Dayton, Ohio.

CASTINGS—Iron and Steel

Jeffrey Manufacturing Co., The, Columbus, Ohio.

Link-Belt Company, Philadelphia, Chicago.

Sackett & Sons Co., The A. J., Baltimore, Md.

Stedman's Foundry and Mach. Works, Aurora, Ind.

CEMENT—Acid-Proof

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.

Chemical Construction Corp., New York City.

CHAIN DRIVES—Silent

Link-Belt Company, Philadelphia, Chicago.

Sackett & Sons Co., The A. J., Baltimore, Md.

Stedman's Foundry and Mach. Works, Aurora, Ind.

CHAINS AND SPROCKETS

Jeffrey Manufacturing Co., The, Columbus, Ohio.

Link-Belt Company, Philadelphia, Chicago.

Sackett & Sons Co., The A. J., Baltimore, Md.

Stedman's Foundry and Mach. Works, Aurora, Ind.

CHAMBERS—Acid

Chemical Construction Corp., New York City.

Fairlie, Andrew M., Atlanta, Ga.

CHEMICAL APPARATUS

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.

Duriron Co., Inc., The, Dayton, Ohio.

Monarch Mfg. Works, Inc., Philadelphia, Pa.

CHEMICALS

American Agricultural Chemical Co., New York City.

American Cyanamid Co., New York City.

Armour Fertilizer Works, Atlanta, Ga.

Ashcraft-Wilkinson Co., Atlanta, Ga.

Baker & Bro., H. J., New York City.

Barrett Company, The, New York City.

Bradley & Baker, New York City.

DuPont de Nemours & Co., E. I., Wilmington, Del.

CHEMICALS—Continued

Huber & Company, New York City.

Phosphate Mining Co., The, New York City.

Wellmann, William E., Baltimore, Md.

CHEMICAL PLANT CONSTRUCTION

Atlanta Utility Works, East Point, Ga.

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.

Chemical Construction Corp., New York City.

Fairlie, Andrew M., Atlanta, Ga.

Sackett & Sons Co., The A. J., Baltimore, Md.

Stedman's Foundry and Mach. Works, Aurora, Ind.

CHEMISTS AND ASSAYERS

Gascoyne & Co., Baltimore, Md.

Shuey & Company, Inc., Savannah, Ga.

Stillwell & Gladding, New York City.

Wiley & Company, Baltimore, Md.

CLUTCHES

Jeffrey Manufacturing Co., The, Columbus, Ohio.

Link-Belt Company, Philadelphia, Chicago.

Sackett & Sons Co., The A. J., Baltimore, Md.

Stedman's Foundry and Mach. Works, Aurora, Ind.

CONCENTRATORS—Sulphuric Acid

Chemical Construction Corp., New York City.

Fairlie, Andrew M., Atlanta, Ga.

CONDITIONERS AND FILLERS

American Limestone Co., Knoxville, Tenn.

Dickerson Co., The, Philadelphia, Pa.

Phosphate Mining Co., The, New York City.

CONTACT ACID PLANTS

Chemical Construction Corp., New York City.

COPPER SULPHATE

Tennessee Corporation, Atlanta, Ga.

COTTONSEED PRODUCTS

Ashcraft-Wilkinson Co., Atlanta, Ga.

Baker & Bro., H. J., New York City.

Bradley & Baker, New York City.

Huber & Company, New York City.

Jett, Joseph C., Norfolk, Va.

Schmalz, Jos. H., Chicago, Ill.

Taylor, Henry L., Wilmington, N. C.

Wellmann, William E., Baltimore, Md.

CRANES AND DERRICKS

Hayward Company, The, New York City.

Link-Belt Company, Philadelphia, Chicago.

Link-Belt Speeder Corp., Chicago, Ill., and Cedar

Rapids, Iowa.

Sackett & Sons Co., The A. J., Baltimore, Md.

CYANAMID

American Agricultural Chemical Co., New York City.

American Cyanamid Co., New York City.

Ashcraft-Wilkinson Co., Atlanta, Ga.

Baker & Bro., H. J., New York City.

Bradley & Baker, New York City.

Jett, Joseph C., Norfolk, Va.

Taylor, Henry L., Wilmington, N. C.

Wellmann, William E., Baltimore, Md.

DENS—Superphosphate

Chemical Construction Corp., New York City.

Stedman's Foundry and Mach. Works, Aurora, Ind.

Andrew M. Fairlie

CHEMICAL ENGINEER

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Building ATLANTA, GA.
CABLE ADDRESS: "SULFACID ATLANTA"

SULPHURIC Acid Plants . . . Design, Construction, Equipment . . . Operation . . . Mills-Packard Water-Cooled Acid Chambers, Gaillard Acid-Cooled Chambers, Gaillard Acid Dispersers, Contact Process Sulphuric Acid Plants.

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DISINTEGRATORS

Atlanta Utility Works, East Point, Ga.
Jeffrey Manufacturing Co., The, Columbus, Ohio.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

DRYERS—Direct Heat

Jeffrey Manufacturing Co., The, Columbus, Ohio.
Sackett & Sons Co., The A. J., Baltimore, Md.

DRIVES—Electric

Link-Belt Company, Philadelphia, Chicago.

DUMP CARS

Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

DUST COLLECTING SYSTEMS

Sackett & Sons Co., The A. J., Baltimore, Md.

ELECTRIC MOTORS AND APPLIANCES

Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

ELEVATORS

Atlanta Utility Works, East Point, Ga.
Jeffrey Manufacturing Co., The, Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

ELEVATORS AND CONVEYORS—Portable

Jeffrey Manufacturing Co., The, Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

ENGINEERS—Chemical and Industrial

Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

ENGINES—Steam

Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

EXCAVATORS AND DREDGES—Drag Line and Cableway

Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.
Link Belt Speeder Corp., Chicago, Ill., and Cedar
Rapids, Iowa.

FERTILIZER MANUFACTURERS

American Agricultural Chemical Co., New York City.
American Cyanamid Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Farmers Fertilizer Co., Columbus, Ohio.
International Agricultural Corporation, Chicago, Ill.
Phosphate Mining Co., The, New York City.
U. S. Phosphoric Products Division, Tennessee Corp.,
Tampa, Fla.

FISH SCRAP AND OIL

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Taylor, Henry L., Wilmington, N. C.
Wellmann, William E., Baltimore, Md.

FOUNDERS AND MACHINISTS

Atlanta Utility Works, East Point, Ga.
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Jeffrey Manufacturing Co., The, Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

GARBAGE TANKAGE

Wellmann, William E., Baltimore, Md.

GEARS—Machine Moulded and Cut

Jeffrey Manufacturing Co., The, Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

GEARS—Silent

Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

GELATINE AND GLUE

American Agricultural Chemical Co., New York City.

GUANO

Baker & Bro., H. J., New York City.

HOISTS—Electric, Floor and Cage Operated, Portable

Hayward Company, The, New York City.

Jeffrey Manufacturing Co., The, Columbus, Ohio.

HOPPERS

Atlanta Utility Works, East Point, Ga.

Jeffrey Manufacturing Co., The, Columbus, Ohio.

Link-Belt Company, Philadelphia, Chicago.

Sackett & Sons Co., The A. J., Baltimore, Md.

Stedman's Foundry and Mach. Works, Aurora, Ind.

IMPORTERS, EXPORTERS

Armour Fertilizer Works, Atlanta, Ga.

Ashcraft-Wilkinson Co., Atlanta, Ga.

Baker & Bro., H. J., New York City.

Bradley & Baker, New York City.

Wellmann, William E., Baltimore, Md.

IRON SULPHATE

Tennessee Corporation, Atlanta, Ga.

INSECTICIDES

American Agricultural Chemical Co., New York City.

McLaughlin Gormley King Co., Minneapolis, Minn.

LACING—Belt

Sackett & Sons Co., The A. J., Baltimore, Md.

LIMESTONE

American Agricultural Chemical Co., New York City.

American Limestone Co., Knoxville, Tenn.

Ashcraft-Wilkinson Co., Atlanta, Ga.

Baker & Bro., H. J., New York City.

Bradley & Baker, New York City.

Wellmann, William E., Baltimore, Md.

LOADERS—Car and Wagon, for Fertilizers

Jeffrey Manufacturing Co., The, Columbus, Ohio.

Link-Belt Company, Philadelphia, Chicago.

Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Acid Making

Atlanta Utility Works, East Point, Ga.

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.

Chemical Construction Corp., New York City.

Duriron Co., Inc., The, Dayton, Ohio.

Fairlie, Andrew M., Atlanta, Ga.

Monarch Mfg. Works, Inc., Philadelphia, Pa.

Sackett & Sons Co., The A. J., Baltimore, Md.

Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Coal and Ash Handling

Hayward Company, The, New York City.

Jeffrey Manufacturing Co., The, Columbus, Ohio.

Link-Belt Company, Philadelphia, Chicago.

Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Elevating and Conveying

Atlanta Utility Works, East Point, Ga.

Hayward Company, The, New York City.

Jeffrey Manufacturing Co., The, Columbus, Ohio.

Link-Belt Company, Philadelphia, Chicago.

Sackett & Sons Co., The A. J., Baltimore, Md.

Stedman's Foundry and Mach. Works, Aurora, Ind.

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MACHINERY—Grinding and Pulverizing

Atlanta Utility Works, East Point, Ga.
Jeffrey Manufacturing Co., The, Columbus, Ohio.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Power Transmission

Jeffrey Manufacturing Co., The, Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Pumping

Atlanta Utility Works, East Point, Ga.
Duriron Co., Inc., The, Dayton, Ohio.

MACHINERY—Tankage and Fish Scrap

Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MAGNETS

Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MANGANESE SULPHATE

McIver & Son, Alex. M., Charleston, S. C.
Tennessee Corporation, Atlanta, Ga.

MIXERS

Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

NITRATE OF SODA

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Barrett Company, The, New York City.
Bradley & Baker, New York City.
Chilean Nitrate Sales Corp., New York City.
Huber & Company, New York City.
International Agricultural Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Schmalz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

NITRATE OVENS AND APPARATUS

Chemical Construction Corp., New York City.

NITROGEN SOLUTIONS

Barrett Company, The, New York City

NITROGENOUS ORGANIC MATERIAL

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
DuPont de Nemours & Co., Wilmington, Del.
Huber & Company, New York City.
International Agricultural Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Smith-Rowland Co., Norfolk, Va.
Wellmann, William E., Baltimore, Md.

NOZZLES—Spray

Monarch Mfg. Works, Philadelphia, Pa.

PACKING—For Acid Towers

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.

PANS AND POTS

Stedman's Foundry and Mach. Works, Aurora, Ind.

PHOSPHATE MINING PLANTS

Chemical Construction Corp., New York City.

PHOSPHATE ROCK

American Agricultural Chemical Co., New York City.
American Cyanamid Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Charleston Mining Co., Inc., Richmond, Va.
Huber & Company, New York City.
International Agricultural Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
Phosphate Mining Co., The, New York City.
Ruhm, H. D., Mount Pleasant, Tenn.
Schmalz, Jos. H., Chicago, Ill.
Southern Phosphate Corp., Baltimore, Md.
Taylor, Henry L., Wilmington, Del.
Wellmann, William E., Baltimore, Md.

PIPE—Acid Resisting

Duriron Co., Inc., The, Dayton, Ohio.

PIPES—Chemical Stoneware

Chemical Construction Corp., New York City.

PIPES—Wooden

Stedman's Foundry and Mach. Works, Aurora, Ind.

PLANT CONSTRUCTION—Fertilizer and Acid

Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

POTASH SALTS—Dealers and Brokers

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
International Agricultural Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
Schmalz, Jos. H., Chicago, Ill.
Taylor, Henry L., Wilmington, Del.
Wellmann, William E., Baltimore, Md.

POTASH SALTS—Manufacturers

American Potash and Chem. Corp., New York City.
Potash Co. of America, New York City.
Union Potash & Chemical Co., Chicago, Ill.
United States Potash Co., New York City.

PULLEYS AND HANGERS

Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

PUMPS—Acid-Resisting

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Duriron Co., Inc., The, Dayton, Ohio.
Monarch Mfg. Works, Inc., Philadelphia, Pa.

PYRITES—Brokers

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., New York City.
Jett, Joseph C., Norfolk, Va.
Wellmann, William E., Baltimore, Md.

QUARTZ

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.

RINGS—Sulphuric Acid Tower

Chemical Construction Corp., New York City.

ROUGH AMMONIATES

Bradley & Baker, New York City.
Schmalz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

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Jeffrey Manufacturing Co., The, Columbus, Ohio.
Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.

SCREENS

Atlanta Utility Works, East Point, Ga.
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Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

SEPARATORS—Air

Sackett & Sons Co., The A. J., Baltimore, Md.

SEPARATORS—Including Vibrating

Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

SEPARATORS—Magnetic

Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

SHAFTING

Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
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SHOVELS—Power

Jeffrey Manufacturing Co., The, Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.
Link-Belt Speeder Corp., Chicago, Ill., and Cedar
Rapids, Iowa.

Sackett & Sons Co., The A. J., Baltimore, Md.

SPRAYS—Acid Chambers

Monarch Mfg. Works, Inc., Philadelphia, Pa.

SPROCKET WHEELS (See Chains and Sprockets)

STACKS

Sackett & Sons Co., The A. J., Baltimore, Md.

SULPHATE OF AMMONIA

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
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Schmaltz, Jos. H., Chicago, Ill.
Taylor, Henry L., Wilmington, N. C.
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SULPHUR

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Freeport Sulphur Co., New York City.
Texas Gulf Sulphur Co., New York City.

SULPHURIC ACID

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Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
Taylor, Henry L., Wilmington, N. C.

SULPHURIC ACID—Continued

U. S. Phosphoric Products Division, Tennessee Corp.,
Tampa, Fla.
Wellmann, William E., Baltimore, Md.

SUPERPHOSPHATE

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Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
International Agricultural Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
Schmaltz, Jos. H., Chicago, Ill.
Taylor, Henry L., Wilmington, N. C.
U. S. Phosphoric Products Division, Tennessee Corp.,
Tampa, Fla.
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SUPERPHOSPHATE—Concentrated

Armour Fertilizer Works, Atlanta, Ga.
International Agricultural Corporation, Chicago, Ill.
Phosphate Mining Co., The, New York City.
U. S. Phosphoric Products Division, Tennessee Corp.,
Tampa, Fla.

SYPHONS—For Acid

Monarch Mfg. Works, Inc., Philadelphia, Pa.

TALLOW AND GREASE

American Agricultural Chemical Co., New York City.

TANKAGE

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
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International Agricultural Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
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Smith-Rowland, Norfolk, Va.
Taylor, Henry L., Wilmington, N. C.
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TANKAGE—Garbage

Huber & Company, New York City.

TANKS

Jeffrey Manufacturing Co., The, Columbus, Ohio.
Sackett & Sons, Co., The A. J., Baltimore, Md.

TILE—Acid-Proof

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.

TOWERS—Acid and Absorption

Chemical Construction Corp., New York City.

Fairlie, Andrew M., Atlanta, Ga.

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Hayward Company, The, New York City.
Jeffrey Manufacturing Co., The, Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

UREA

DuPont de Nemours & Co., E. I., Wilmington, Del.

UREA-AMMONIA LIQUOR

DuPont de Nemours & Co., E. I., Wilmington, Del.

VALVES—Acid-Resisting

Atlanta Utility Works, East Point, Ga.
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Duriron Co., Inc., The, Dayton, Ohio.
Jeffrey Manufacturing Co., The, Columbus, Ohio.
Monarch Mfg. Works, Inc., Philadelphia, Pa.

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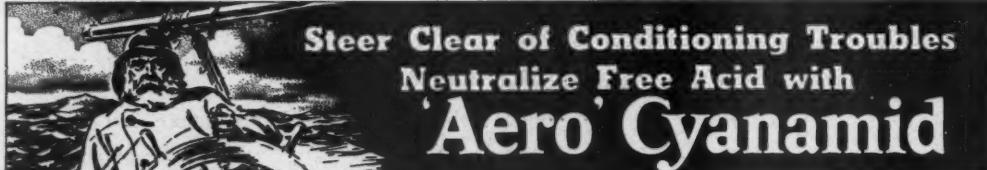
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